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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Donald James Highgate

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EXAMINER

CHERN, CHRISTINA

ART UNIT

PAPER NUMBER

1725

NOTIFICATION DATE

DELIVERY MODE

02/17/2011

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/568,241	Applicant(s) HIGHGATE ET AL.	
	Examiner CHRISTINA CHERN	Art Unit 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 February 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/27/2006</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the titanium dioxide layer separate from the membrane as described in the specification on **page 3 lines 15-16** and it is unclear what parts of the figure the arrows are pointing towards. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities:

Line 2 on page 2 should read: “membrane may comprise one or **more** channels for the transmission of light.”

Appropriate correction is required.

Claim Objections

3. **Claims 1, 6, 7, 11, 12, 14, 17, and 20** are objected to because of the following informalities:

It is suggested that claim 1 is corrected to read: “a photovoltaic cell comprising a membrane electrode assembly capable of transmitting light”.

It is suggested that claim 14 lines 2-3 is corrected to read: “a photovoltaic cell comprising a membrane electrode assembly capable of transmitting light”.

The limitation “the assembly” in claims 6, 7, 11, 12, 17, and 20 should read “the membrane electrode assembly”.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. **Claims 1-20** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to

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which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claims recite a photovoltaic cell which is a membrane electrode assembly capable of transmitting light. The specification would not enable one of ordinary skill in the art to make and/or use the invention because it is not disclosed how the membrane electrode assembly would function as a photovoltaic cell. While the specification contains support for a membrane electrode assembly as shown in **Figure 1** and that a dye sensitizer such as ruthenium may be disposed throughout the membrane (**page 2 line 32- page 3 line 3**), the specification does not disclose any further details as to how the membrane electrode assembly would function as a photovoltaic cell.

The state of the prior art includes membrane electrode assemblies for use in fuel cells (see **Highgate (US 2003/0113603)**) and in photoelectrolysis applications (see **Highgate et al. (US 2003/0226762)**).

The level of one of ordinary skill in the art is low; a photovoltaic cell comprising a membrane electrode assembly is not well known in the art.

The amount of direction provided by the inventor is low. The inventor discloses that a dye sensitizer such as ruthenium commonly used in dye sensitized solar cells may be disposed throughout the membrane (**page 2 line 32- page 3 line 3**). The inventor also discloses a cell of the invention in which a tin oxide glass was coated with titanium dioxide to act as an electrode and a carbon fabric coated with platinum was used as another electrode with an AN-VP-AMPSA copolymer membrane (**page 3 lines 14-16**), but it was not disclosed how the membrane electrode assembly would function

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as a photovoltaic cell due to the lack of a disclosed charge transport layer and photoactive layer.

Therefore, the claims would not enable one skilled in the art to make and/or use the invention.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. **Claims 2, 5, 9, 10, 15, 18, and 19** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claims 2, 5, 9, 10, 15, 18, and 19 recite the limitation "the membrane". There is insufficient antecedent basis for this limitation in the claims.

9. The term "strongly ionic group" in claim 2 is a relative term which renders the claim indefinite. The term "strongly ionic group" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term "strongly ionic group" will be interpreted as any functional ionic group for the photovoltaic cell.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. **Claims 1-20** are rejected under 35 U.S.C. 102(b) as being anticipated by Chiba et al. (US 2002/0134426).

Regarding **claim 1**, Chiba discloses a photovoltaic cell ([0023]; see **Figure 1**) which is a membrane electrode assembly (electrodes **10 and 20** and membrane **6**) capable of transmitting light (it is inherent a photovoltaic cell is capable of transmitting light; it is also disclosed the substrate **1** and electroconductive film **2** are transparent; [0025]).

Regarding **claim 2**, Chiba discloses all the claim limitations as set forth above, and further discloses the membrane is a material comprising a polymer ([0065 and 0067], the polymer comprising a strongly ionic group (it is disclosed the redox species can be selected corresponding to the necessary ionic conductivity ([0068], also, the ionic group must be somewhat strong in order to function as a desirable polymer electrolyte within the photovoltaic cell).

Regarding **claim 3**, Chiba discloses all the claim limitations as set forth above, and further discloses the polymer is hydrophilic ([0067]).

Regarding **claim 4**, Chiba discloses all the claim limitations as set forth above, and further discloses the polymer is cross-linked ([0067]).

Regarding **claim 5**, Chiba discloses all the claim limitations as set forth above, and further discloses the membrane is a malleable material (it is disclosed the polymer comprises a polymer functional group and a polymer side chain ([0067]), which means the membrane would have some degree of flexibility and malleability).

Regarding **claim 6**, Chiba discloses all the claim limitations as set forth above, and further discloses the assembly is in the form of a stack (see **Figure 1**).

Regarding **claims 7 and 8**, Chiba discloses all the claim limitations as set forth above, and further discloses the assembly comprises a catalyst (**8**), wherein the catalyst comprises platinum and/or titanium dioxide (**[0064]**).

Regarding **claims 9 and 10**, Chiba discloses all the claim limitations as set forth above, and further discloses the membrane comprises a channel suitable for the transmission of light and the membrane is optically transparent (it is disclosed the membrane comprises a transparent polymer; **[0065]**).

Regarding **claim 11**, Chiba discloses all the claim limitations as set forth above, and further discloses the assembly comprises a dye sensitizer (it is disclosed a dye is absorbed on the photovoltaic layer **3**; **[0023]**).

Regarding **claim 12**, Chiba discloses all the claim limitations as set forth above, and further discloses the assembly is planar in structure (see **Figure 1**).

Regarding **claim 13**, Chiba discloses all the claim limitations as set forth above, and further discloses an electrode is transparent (**[0024-0025]**).

Regarding **claim 14**, Chiba discloses a method for generating a voltage, wherein said method comprises irradiating a photovoltaic cell (**[0023]**; see **Figure 1**) that is a membrane electrode assembly (electrodes **10 and 20** and membrane **6**) capable of transmitting light (it is inherent a voltage is generated when a photovoltaic cell is exposed to radiation. it is also inherent a photovoltaic cell is capable of transmitting

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light; it is also disclosed the substrate **1** and electroconductive film **2** are transparent; **[0025]**).

It is noted that statements in the preamble reciting the purpose or intended use of the claimed invention which do not result in a structural difference (or, in the case of process claims, manipulative difference) between the claimed invention and the prior art do not limit the claim and do not distinguish over the prior art apparatus (or process). See, e.g., *In re Otto*, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963); *In re Sinex*, 309 F.2d 488, 492, 135 USPQ 302, 305 (CCPA 1962). If a prior art structure is capable of performing the intended use as recited in the preamble, then it meets the claim. See, e.g., *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997) and cases cited therein, as it has been held that the recitation of a new intended use for an old product does not make a claim to that old product patentable. *In re Schreiber*, 44 USPQ2d 1429 (Fed. Cir. 1997). See also MPEP § 2111.02, §2112.02 and 2114-2115.

Regarding **claims 15 and 16**, Chiba discloses all the claim limitations as set forth above, and further discloses the membrane is a material comprising a polymer (**[0065 and 0067]**), wherein the polymer is hydrophilic and/or cross-linked (**[0067]**).

Regarding **claim 17**, Chiba discloses all the claim limitations as set forth above, and further discloses the assembly comprises a catalyst (**8; [0064]**).

Regarding **claims 18 and 19**, Chiba discloses all the claim limitations as set forth above, and further discloses the membrane comprises a channel suitable for the transmission of light and the membrane is optically transparent (it is disclosed the membrane comprises a transparent polymer; **[0065]**).

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Regarding **claim 20**, Chiba discloses all the claim limitations as set forth above, and further discloses the assembly comprises a dye sensitizer (it is disclosed a dye is absorbed on the photovoltaic layer **3**; **[0023]**).

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTINA CHERN whose telephone number is (571) 270-1486. The examiner can normally be reached on Mon.-Thurs., 7:00 AM-5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on (571) 272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/CHRISTINA CHERN/
Examiner, Art Unit 1725

/Basia Ridley/
Supervisory Patent Examiner, Art Unit 1725